Epitomes

Important Advances in Clinical Medicine

Pediatrics

The Scientific Board of the California Medical Association presents the following inventory of items of progress in pediatrics. Each item, in the judgment of a panel of knowledgeable physicians, has recently become reasonably firmly established, both as to scientific fact and important clinical significance. The items are presented in simple epitome and an authoritative reference, both to the item itself and to the subject as a whole, is generally given for those who may be unfamiliar with a particular item. The purpose is to assist busy practitioners, students, research workers, or scholars to stay abreast of these items of progress in pediatrics that have recently achieved a substantial degree of authoritative acceptance, whether in their own field of special interest or another.

The items of progress listed below were selected by the Advisory Panel to the Section on Pediatrics of the California Medical Association and the summaries were prepared under its direction.

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Ribavirin and Respiratory Syncytial Virus Infections

RESPIRATORY SYNCYTIAL VIRUS (RSV) is the most frequent cause of hospital admissions of infants with respiratory tract disease. In previously healthy infants, the RSV infection subsides in three to seven days, and most infants recover without sequelae; some will have reactive airway disease with subsequent respiratory tract infections. Substantial morbidity and, infrequently, death may occur among infants with preexisting severe pulmonary or cardiac disease. Most severely affected infants have signs and symptoms of bronchiolitis or acute pneumonitis, or both, and clinically significant hypoxemia develops due to bronchiolar spasm or alveolar-capillary block, or both. A significant proportion of the sickest infants require ventilatory support. In those infants with severe bronchopulmonary dysplasia, severe cyanotic heart disease with increased pulmonary blood flow, and cellular immunodeficiency syndromes, the outcome may be uncertain.

RSV infection is generally limited to the respiratory tract epithelium; the pathogenesis of the disease probably is an extensive cellular pathologic disorder and acute host-mediated responses, including immunoglobulin (Ig) E-mediated activity. Ribavirin aerosol therapy, developed over the past decade, appears to ameliorate or diminish these pathologic events.

Ribavirin (Virazole) is a nucleoside analogue that is activated in host tissues to its phosphorylated form; antiviral activity results in the inhibition of viral RNA synthesis. Ribavirin aerosol therapy was pioneered in controlled studies among college students with acute influenza virus A infections and then extended to RSV infections among infants. Therapeutic efficacy has been shown among infants and children admitted to hospital with and without preexisting pulmonary and cardiac disease. Benefits occur without significant drug toxicity, and five-year follow-up evaluations show no effects of the aerosol therapy on the respiratory tract.

High concentrations of ribavirin are delivered in an aerosol by a small-particle aerosol generator through a mask, tent, or endotracheal tube over a 12- to 18-hour treatment period per day for three to five days or, in some cases, longer. The respiratory staff needs to give careful attention to drug precipitation in the respiratory equipment during therapy, especially among patients with endotracheal tubes in place.

In general, ribavirin therapy may be expected to control chronic infections among immunocompromised patients and to ameliorate infections among other treated inpatients. The most significant result of therapy is the relief of hypoxemia; this may be due to the control of the virus infection, an inhibition of IgE-mediated responses by ribavirin, or both. Ribavirin aerosol therapy may be indicated in infants and young children with RSV infection complicated by pneumonia, apnea, progressive bronchiolitis with hypoxemia, congenital heart disease, and chronic lung disease.

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Update on α-Fetoprotein Screening

SCREENING OF ALL PREGNANCIES for neural tube and other birth defects, using the maternal serum α-fetoprotein (AFP) level, is now a routine practice.

AFP produced by the fetal liver appears in the maternal serum in a measurable quantity by the 15th completed week and increases in concentration until term. Maternal serum AFP results are reported as multiples of the median value for a given gestational age and, as such, have provided a number of insights into conditions affecting a fetus or pregnancy.

The usefulness of maternal serum AFP screening is improved with accurate pregnancy dating and when raw values are adjusted for race, body weight, and the presence of insulin-dependent diabetes. The AFP levels can be raised or lowered in maternal serum by several conditions affecting fetal production or transplacental or amniotic diffusion. These conditions include multiple gestations; fetal demise; and structural fetal defects such as open spina bifida, gastroschisis, and omphalocele. It is necessary, therefore, to examine carefully the pregnancies of women having abnormal AFP values. This begins with ultrasonography to confirm the gestational age and the presence of a single fetus that is viable and has no structural defect. A woman with an abnormal